engineering fracture mechanics

List of Contents and Author Index
Volume 51, 1995

PERGAMON

engineering fracture mechanics

An International Journal

EDITOR-IN-CHIEF
PROFESSOR HAROLD LIEBOWITZ

c/o A.E.R.D.C.O.
P.O. Box 25736
Washington, DC 20007-8736, U.S.A.

EDITORIAL ADVISORY BOARD

PROFESSOR S. N. ATLURI
Georgia, U.S.A.

DR. ZDENEK BILEK
Brno, Czech Republic

PROFESSOR BRUNO A. BOLEY
New York, U.S.A.

DR. DAVID BROEK
Ohio, U.S.A.

PROFESSOR JANNE CARLSSON
Stockholm, Sweden

PROFESSOR G. P. CHEREPANOV
Florida, U.S.A.

PROFESSOR H. T. CORTEN
Illinois, U.S.A.

DR. THEODOR GAYMANN
Munich, Germany

DR. GEORGE T. HAHN
Tennessee, U.S.A.

PROFESSOR GEORGE HERRMANN
California, U.S.A.

PROFESSOR D. L. JONES
Washington, D.C., U.S.A.

PROFESSOR HIROSHI KIHARA
Tokyo, Japan

DR. J. M. KRAFFT
Virginia, U.S.A.

PROFESSOR JAMES D. LEE
Washington, D.C., U.S.A.

PROFESSOR FRANK A. McCLINTOCK
Massachusetts, U.S.A.

PROFESSOR A. J. McEVILY
Connecticut, U.S.A.

PROFESSOR JAROSLAV NEMEC
Prague, Czech Republic

DR. NICHOLAS PERRONE
Maryland, U.S.A.

DR. J. SCHIJVE
Delft, The Netherlands

DR. WALTER SCHUTZ
Ottobrunn, Germany

PROFESSOR GEORGE C. SIH
Pennsylvania, U.S.A.

PROFESSOR JANN N. YANG
California, U.S.A.

PROFESSOR TAKEO YOKOBORI
Utsunomiya, Japan

Production Editors: Zara Wilcock and Mary Ker, Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England (Tel (01865) 843000; Telex 83177; Fax (01865) 843010; e-mail z.wilcock@elsevier.co.uk).

Publishing, Subscription and Advertising Offices: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England; or Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Subscription Rates
Annual Institutional Subscription Rates 1995: North, Central and South America, U.S.$2124.00, rest of the world, £1425.00. Associated Personal Subscription Rates are available on request for those whose institutions are library subscribers. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.
Second class postage paid at NEWARK NJ and additional Mailing Offices. Postmaster send address corrections to Engineering Fracture Mechanics, c/o Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

Published Monthly plus Additional Issues in January, March, May, July, September and November (Three Volumes 1995). Subscription enquiries from customers in North America should be sent to Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A. and for the remainder of the world to Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England.

Back Issues of all previously published volumes, in both hard copy and on microform, are available direct from Elsevier Science offices.

Whilst every effort is made by the publishers and editorial board to see that no inaccurate or misleading data, opinion or statement appear in this journal, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the sole responsibility of the contributor or advertiser concerned. Accordingly, the publishers, the editorial board and editors and their respective employees, officers and agents accept no responsibility or liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

Copyright © 1995 Elsevier Science Ltd

The cover picture was taken by Dr Erwin Sommer in his studies at the Ernst Mach Institute in Freiburg, Germany, in work under the direction of Dr F. Kerkhof. Dr Sommer is Director of Fraunhofer-Institut Fuer Werkstoffmechanik, Rosastraße, 9, 7800 Freiburg, Germany.

List of Contents

NUMBER 1

T. N. Nguyen and **M. A. Wahab**	1	A theoretical study of the effect of weld geometry parameters on fatigue crack propagation life
Y. F. Al-Obaid	19	The effect of shot peening on stress corrosion cracking behaviour of 2205-Duplex stainless steel
H. El Kadi and **F. Ellyin**	27	Crack extension in unidirectional composite laminae
Hsien-Yang Yeh and **R. Chun-Yen Lee**	37	Simple analysis of the Yeh–Stratton failure criterion on composite materials
Guo Wanlin	51	Elasto-plastic three-dimensional crack border field—III. Fracture parameters
B. Shen	73	The mechanism of fracture coalescence in compression—experimental study and numerical simulation
N. Eswara Prasad, K. S. Prasad, S. V. Kamat and **G. Malakondaiah**	87	Influence of microstructural features on the fracture resistance of aluminium–lithium alloy sheets
Y. Z. Chen	97	A survey of new integral equations in plane elasticity crack problem
		Technical Notes
B. C. Sheu, P. S. Song and **S. Hwang**	135	Shaping exponent in Wheeler model under a single overload
J. Morrison and **K. J. KarisAllen**	145	An experimental comparison of J and CTOD estimation formulas
J. Cordes, A. Chang, N. Nelson and **Y. Kim**	151	A computational method to predict elastic–plastic fracture
K. W. Nam, K. Ando and **N. Ogura**	161	Surface fatigue crack life and penetration behavior of stress concentration specimen
	I	Software Survey Section
	i	Index to Volume 50

NUMBER 2

M. S. Hasan and **E. Jordan**	167	An approximate analysis of perpendicular cracks under general in-plane loading
E. N. Theotokoglou	193	Mixed-mode caustics for the cracked infinite plate using the exact solution

Li Zhou	205	The fracture toughness and mechanism of 20 steel under different conditions of low temperature and stress states
R. Dal Maschio and **L. Nobile**	209	A simplified approach for ceramic fracture toughness evaluation by indentation
J. Y. Huang	217	Interaction of SH-waves with a finite crack in a half-space
T. Fett	225	Weight function for an edge crack with tractions at arbitrary locations in the body
D. Y. Jeong and **J. C. Brewer**	233	On the linkup of multiple cracks
P. S. Theocaris	239	Failure criteria for isotropic bodies revisited
V. G. Ukadgaonker and **P. J. Awasare**	265	A new criterion for fracture initiation
Tie-Jun Wang	275	Prediction of sheet forming limits using a new continuum damage mechanics criterion for ductile fracture
D. Radaj and **S. Zhang**	281	Geometrically nonlinear behaviour of spot welded joints in tensile and compressive shear loading
T. Belytschko, Y. Y. Lu and **L. Gu**	295	Crack propagation by element-free Galerkin methods
		Technical Notes
B. Nageswara Rao and **A. R. Acharya**	317	Evaluation of fracture energy G_{IC} using a double cantilever beam fibre composite specimen
J. Riedle, J. Wulf and **S. Schmauder**	323	A method for measuring compliances and crack length by strain gauge and 3D finite element calculation
T. Troczynski and **J. Camire**	327	On use of double cantilever beam for coatings and adhesion tests
		Letter to the Editor
P. G. Th. van der Varst and **G. de With**	333	Notes on the paper: a thermodynamic framework of fracture mechanics
	335	Erratum
	I	Software Survey Section
		NUMBER 3
Sun Yi, C. Eripret and **G. Rousselier**	337	Influence of defect shape on damage evolution and fracture behavior of ductile materials
Yi-Heng Chen and **N. Hasebe**	349	On the influence of orthotropic material constants on the neutral-shielding angle in main–micro crack interaction problems

J. H. Park, R. Singh, C. R. Pyo and **S. N. Atluri**	361	Integrity of aircraft structural elements with multi-site fatigue damage
Sun Yi	381	Influence of void nucleation and growth on deformation localization in tensile sheet specimen
W. X. Zhu and **D. J. Smith**	391	On the use of displacement extrapolation to obtain crack tip singular stresses and stress intensity factors
A. Berkovits and **D. Fang**	401	Study of fatigue crack characteristics by acoustic emission
G. Laird II and **T. C. Kennedy**	417	Micromechanics of composite materials under compressive loading
L. M. Stehn, S. J. Defranco and **J. P. Dempsey**	431	Orientation effects on the fracture of pond (S1) ice
Wang Zi-Kun and **Huang Shang-Heng**	447	Fields near elliptical crack tip in piezoelectric ceramics
H. Noguchi, Y.-H. Kim and **H. Nisitani**	457	On the cumulative fatigue damage in short carbon fiber reinforced poly–ether–ether–ketone
Renjie Mao and **G. Sun**	469	A study of the interaction between matrix crack and matrix–fibre interface
Wei Shen, Dongning Chu, Lihua Peng and **Jiachi Xu**	479	Experimental and theoretical studies for fatigue damage of short fiber reinforced metal
Fashang Ma	487	The fracture toughness and fracture assessments of different specimens
Li Zhonghua, Zhao Yong, S. Schmauder and **M. Dong**	497	Quantitative characterization of microcracking in brittle materials by finite element modeling
		Technical Note
R. Picon, F. Paris, J. Cañas and **J. Marin**	505	A complete field method for the photoelastic determination of K_I and K_{II} in general mixed-mode fracture
	I	Software Survey Section

NUMBER 4

X. Wang and **S. B. Lambert**	517	Stress intensity factors for low aspect ratio semi-elliptical surface cracks in finite-thickness plates subjected to nonuniform stresses
A. L. Saleh and **M. H. Aliabadi**	533	Crack growth analysis in concrete using boundary element method

Yueguang Wei and **Tzuchiang Wang**	547	Characterization of elastic–plastic fields near stationary crack tip and fracture criterion
S. B. Biner	555	A FEM analysis of crack growth in microcracking brittle solids
H. L. J. Pang	575	Mixed mode fracture analysis and toughness of adhesive joints
Sang Soon Lee and **Young Jong Kim**	585	Time-domain boundary element analysis of cracked linear viscoelastic solids
K. W. Man, M. H. Aliabadi and **D. P. Rooke**	591	Stress intensity factors in the presence of contact stresses
D.-H. Chen	603	Force and dislocation in an isotropic semi-infinite plate joined to an anisotropic semi-infinite plate
Fashang Ma and **Zhen-Bang Kuang**	615	Continuum damage mechanics treatment of constraint in ductile fracture
M. Ichikawa	629	Reliability evaluation of brittle solids under polyaxial stress states based on maximum energy release rate criterion
R. N. Singh and **C. V. Ramakrishnan**	637	Fracture behaviour of creeping materials under biaxial loading by finite element method
W. Tang and **Y. W. Shi**	649	Influence of strength matching and crack depth on fracture toughness of welded joints
K. S. Zhang	661	Numerical prediction of fracture for TPB specimen of no. 45 steel
Y. W. Shi and **N. N. Zhou**	669	Comparison of microshear toughness and mode II fracture toughness for structural steels
J. C. Sung and **D. C. Wong**	679	Effect of an inclusion on the interaction of elastic waves with a crack
		Technical Note
L. Chattopadhyay	697	Size effect on plastic energy dissipation during stable crack growth
	I	Software Survey Section

NUMBER 5

Tie-Jun Wang	701	An engineering approach to remove the specimen geometry constraint dependence of elastic–plastic fracture toughness
P. S. Theocaris	707	Variances in failure tensor polynomials for anisotropic bodies

H. T. Danyluk, B. M. Singh and J. Vrbik	735	A Dugdale-type estimation of the plastic zone for a penny-shaped crack in a thick transversely isotropic layer due to radial shear
Tae Won Lee	741	The energy release rate for two-dimensional crack problems with centrifugal loads
S. X. Gong	753	On the main crack–microcrack interaction under mode III loading
C. L. Lau, M. M. K. Lee and A. R. Luxmoore	763	A shallow crack assessment scheme for generalised material behaviour in tension
G. S. Wang	787	Intrinsic statistical characteristics of fatigue crack growth rate
Xing-Gang Jiang, Wu-Yang Chu and Ji-Mei Xiao	805	Fractal analysis of orientation effect on K_{1c} and K_{1scc}
D. Chandra and T. Krauthammer	809	Dynamic effects on fracture mechanics of cracked solid
G. Agnihotri	823	Calculation of elastic–plastic strains and stresses in notches under torsion load
Sung Ho Kim, Kang Yong Lee and Moon Bok Park	837	Mode I stress intensity factors for layered material under anti-symmetric loading
		Technical Notes
N. I. Ioakimidis	847	Computer-generated formulae for the location of straight cracks
K. T. Sundara Raja Iyengar, S. Raviraj and A. Venkateswara Gupta	851	Graphical method to determine the parameters of the two-parameter fracture model for concrete
M. R. Bayoumi and A. K. Abdellatif	861	Effect of surface finish on fatigue strength
J. H. Kuang and L. S. Chen	871	A single strain gage method for K_I measurement
	I	Software Survey Section

NUMBER 6

A. Y. T. Leung and R. K. L. Su	879	Body-force linear elastic stress intensity factor calculation using fractal two level finite element method
A. Y. T. Leung and R. K. L. Su	889	Mixed-mode two-dimensional crack problem by fractal two level finite element method

G. Tsamasphyros and **G. Dimou**	897	Stress intensities in a strip reinforced by stiffeners at the edges
Jin Hee Kim, Seung Jo Kim and **Wie Dae Kim**	915	A finite element analysis of damage propagation during metal forming process
S. K. Khanna and **A. Shukla**	933	On the use of strain gages in dynamic fracture mechanics
E. Smith	949	A J_D expression for the double edge notch tension configuration
A. Seweryn and **Z. Mróz**	955	A non-local stress failure condition for structural elements under multiaxial loading
Li Xiang-ping and **Liu Chun-tu**	975	Transient effect on ideally plastic stationary crack-tip fields
A. Bhattacharya	987	Crack tip rotation and shear strain on crack edge of mode II crack in anisotropic plate
G. P. Cherepanov, A. S. Balankin and **V. S. Ivanova**	997	Fractal fracture mechanics—a review
Wei-Hua Tai	1035	Crack initiation condition in the specimens of ductile materials
J. S. Yang and **R. C. Batra**	1041	Conservation laws in linear piezoelectricity
		Technical Note
M. R. Bayoumi and **A. K. Abd El Latif**	1049	Characterization of cyclic plastic bending of austenitic AISI 304 stainless steel
	I	Software Survey Section
	i	Index to Volume 51